

AD-1250 Airflow Measuring Station

Product Bulletin

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The AD-1250 Airflow Measuring Stations are accurate, economical solutions for measuring, reporting, and controlling airflow from 300 to 5,000 Feet Per Minute (FPM) (91 to 1,524 Meters per Minute [MPM]) within $\pm 5\%$ accuracy.

The factory-assembled AD-1250 Airflow Measuring Station incorporates the following items in one 15 in. (38 mm) deep assembly:

- an ultra-low-leak, high-performance, aluminum airfoil blade/aluminum frame control damper
- an aluminum air straightener
- multiple AD-1251 Airflow Sensing Probes
- a DMPR-RA001 Differential Pressure Transducer (DPT)
- galvanized steel sleeve
- M9220-GGC-3 Electric Spring Return Actuators (optional)

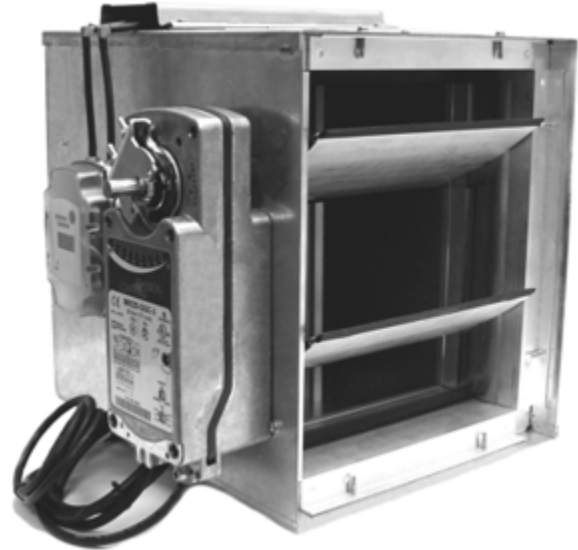


Figure 1: AD-1250 Airflow Measuring Station

Table 1: Features and Benefits

Features	Benefits
Air Movement and Control Association International, Inc. (AMCA) Class IA Damper	Provides very tight sealing for outdoor air applications.
Flanged or Slip Fit Mounting Available	Provides easy installation.
Vertical Anodized Aluminum Sensing Blades	Allow for measurement of lower airflows.
Factory-Piped DPT with Display	Provides visual readout of flow and reduces installation time.
Factory-Installed Actuator	Reduces installation and commissioning time.

Operation

Strategically-placed air measurement probes within the air stream collect total and static pressure samples. Air tubes connected from the step sensors to the DPT allow the DPT to measure airflow as the difference between the total and static pressure samples.

Using the airflow velocity information provided from the step sensors, the Building Automation System (BAS) controller calculates a Cubic Feet per Minute (CFM) value. This value is then compared to the CFM setpoint as determined by the design and particular mode of operation of the Heating, Ventilating, and Air Conditioning (HVAC) system.

Based on the difference between the actual CFM reading and the desired CFM setpoint, the BAS controller interacts with the control damper actuator to position the damper blades as necessary to ensure that the actual outside airflow meets the desired level.

Sample Specifications

Furnish and install, at locations shown on plans or as in accordance with schedules, an air measuring probe system that combines the functions of outside air control damper, air straightener section, and flow monitoring blades in one assembly.

Assembly shall be AMCA tested and capable of measuring a range from 300 to 5,000 FPM (91 to 1,524 MPM).

The air measuring assembly shall measure to $\pm 5\%$ average and consist of 6063T5 extruded aluminum sensing blade(s) with anodized finish, plenum rated polyethylene pressure tubing, brass barbed fittings, mounting hardware and a glass-on-silicone capacitance sensor pressure transducer capable of measuring up to five field-selectable pressure ranges up to 2.5 in. w.c.

The transducer shall be accurate to $\pm 1\%$ of full scale and be contained in a National Electrical Manufacturer's Association (NEMA) 4 (IP-65) enclosure. Transducer shall be factory-mounted and piped to high and low pressure ports through fittings made of brass.

All sensor tubing shall terminate in solid brass barbed fittings.

Frames are to be constructed to incorporate mounting flanges on both sides.

Control blades are to be constructed of heavy-gauge extruded-aluminum airfoil type with thermoplastic elastomer blade edge seals.

Airflow sensing blades shall be anodized, extruded-aluminum, and airfoil-shaped, fixed in a 10 in., 16-gauge galvanized frame and shall incorporate built-in measuring ports.

The probes shall be an extrusion made of 6063T5 aluminum with clear anodized finish.

Air straightener shall be contained in the 16-gauge galvanized sleeve attached to the monitoring blade frame. The air straightener sections shall be flanged as required by the application.

Performance shall be designed to control outdoor air in compliance with American Society of Heating Refrigerating and Air-Conditioning Engineers (ASHRAE) Standard 62 guidelines.

The damper must be rated to operate over a temperature range of -22 to 140°F (-30 to 60°C) standard.

Sizing shall be determined by the designer in accordance with accepted industry practices to ensure proper system performance.

Standard Materials and Construction

The probe with a mounting plate is 20-gauge G60 galvanized steel.

The probe with air straightener includes a 9 in. (229 mm) long x 16 gauge G60 galvanized steel sleeve for slip-fit duct connection.

The complete assembly includes a 15 in. (381 mm) long x 16 gauge G60 galvanized steel sleeve for slip-fit duct connection.

The air straightener is a 1/2 in. (13 mm) honeycomb cell x 3 in. (76 mm) 3000 Series aluminum alloy.

Probe extrusion is made of 6063T5 extruded aluminum with clear anodized finish.

Sensor probe fittings are 1/4 in. (6 mm) brass barbed fitting.

Pressure tubing is plenum-rated polyethylene.

Damper frame is made of 5 in. (127 mm) x 1 in. (25 mm) 6063T5 (.125 mm) extruded aluminum hat channel.

Damper blades are 6 in. (152 mm) wide 6063T5 (.125 mm) extruded aluminum, airfoil shaped blades.

Linkage is made of plated steel and is concealed in end channel of frame.

The axles are 1/2 in. (13 mm) plated steel hex.

The bearings are made of molded synthetic material.

The side seal is flexible metal compression type along control damper sides.

Blade seals are thermoplastic elastomer seal along control damper blade edges.

Dimensions

See Table 2, Figure 2, and Figure 3 for dimensional information.

Table 2: Dimensions

Size Limits	Width x Height, in. (mm)
Minimum Single Panel	10 x 10 (254 x 254)
Maximum Single Panel	18 square feet (1.672 square meters)
Maximum Multiple Panel with Air Straightener	640 x 300 (16,256 x 7,620)

Note: Actual size is 1/4 in. (6 mm) less than nominal.

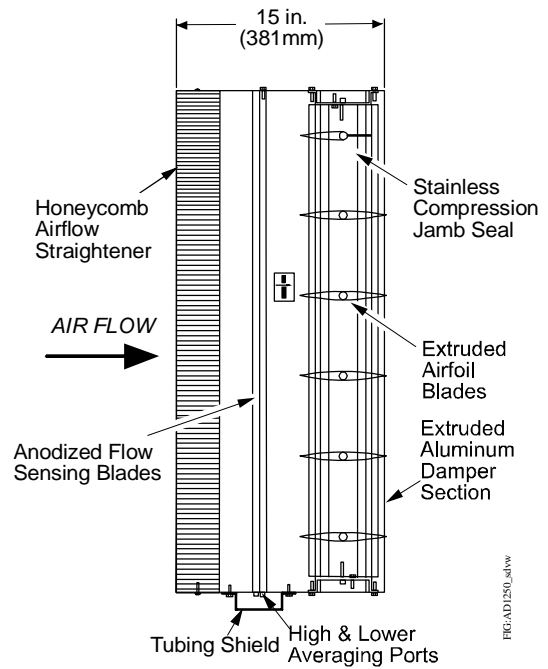


Figure 3: AD-1250 Airflow Measuring Station (Side View)

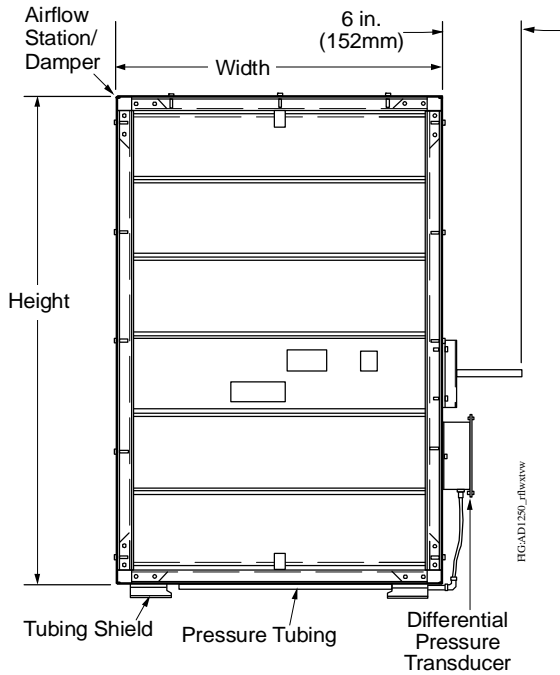


Figure 2: AD-1250 Airflow Measuring Station (Airflow Exit View)

Test Criteria

Test data is based on multiple sizes and AMCA test setup configurations. Compare data to other manufacturers that claim lower accuracy, and find that their data is based on one size in the most favorable test configuration. Some manufacturers do not even test to AMCA standards. You can trust Johnson Controls, Inc. to have the most comprehensive test data in the industry, so you can use our products with confidence.

Model

Method: Differential Pressure

Duct Sizes:

- 12 x 12 in. (30 x 30 mm)
- 24 x 24 in. (609 x 609 mm)
- 36 x 36 in. (914 x 914 mm)

Rated Duct Size: Rectangular duct with cross-sectional areas between 0.5 and 18 square feet (0.046 and 1.672 square meters).

Test set up: Refer to Figures 1 and 2 of AMCA Standard 610-93.

CFM Calculations

$$\text{CFM} = \text{Free Area} \times \text{Ka} \times \text{PAMS}^{1/m}$$

Where

$$\text{FPM} = \text{Ka} \times \text{PAMS}^{1/m}$$

Ka = Proprietary constant value based on test data.

(See Table 3.)

$$\text{Free Area} = [\text{Duct width (in.)} \times \text{Duct Height (in.)}] / 144$$

Table 3: Ka and l/m values for AD-1250 Airflow Measuring Station

Application	Ka	l/m
12 x 12	2,518	0.5061
24 x 24	2,562	0.5029
36 x 36	2,685	0.5155

Pressure Across Measuring Station (PAMS)

PAMS charts are provided for each unit shipped. **This chart is a sample for information only.**

Table 4: PAMS, CFM, and FPM Ratings

PAMS	CFM	FPM
0.005	1,077	215
0.01	1,524	320
0.02	2,155	453
0.03	2,639	554
0.04	3,047	640
0.05	3,407	716
0.06	3,732	784
0.07	4,031	847
0.08	4,310	905
0.09	4,571	960
0.10	4,818	1,012
0.11	5,054	1,061
0.12	5,278	1,109
0.13	5,494	1,154
0.14	5,701	1,197
0.15	5,901	1,239
0.20	6,814	1,431
0.30	8,346	1,753
0.40	9,637	2,024
0.50	10,774	2,263
0.60	11,802	2,479
0.70	12,748	2,677
0.80	13,628	2,862
0.90	15,455	3,036
1.0	15,237	3,200

Ordering Information

Use the following to select the product:

1. Determine required size from drawings.
2. Select the part number required. See Table 5.

Table 5: Valid Part Numbers

Part Number	Description
APESN-wwwxhhh	AD-1250 Airflow Measuring Station (No Actuator)
APESW-wwwxhhh	AD-1250 Airflow Measuring Station with optional M9208 or M9220 Actuator(s) ¹

1. The number of factory-mounted actuators is based on published torque rating of 7 lb.-in./sq ft at 1-inch static pressure. Refer to the *M9220-xxx-3 Electric Spring Return Actuators Product Bulletin (LIT-12011057)* and *M9208-xxx-x Electric Spring Return Actuators Product Bulletin (LIT-12011480)* for specifications.

3. Enter width and height of duct.

www = width of duct (in inches)

hhh = height of duct (in inches)

Note: Actual probe size is 1/4 in. less than nominal.

4. Enter options required.

E = Exact whole inch size, no undercut

H = Double flange (see Figure 4)

Example: APESN-020x020 is an airflow measuring system with dimensions of 20 inches wide x 20 inches high, and enclosed in a 15-inch long sleeve without flanges for a slip fit.

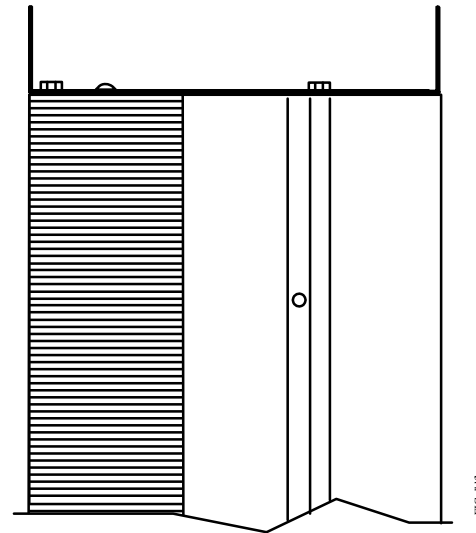


Figure 4: Double Flange

Repair Information

If the AD-1250 Airflow Measuring Station fails to operate within its specifications, replace the unit. For a replacement AD-1250 Airflow Measuring Station, contact the nearest Johnson Controls® representative.

All AD-1250 Airflow Measuring Stations are built to order and cannot be returned due to ordering errors. Airflow measuring stations are backed by a 1-year warranty, which covers defects in materials or workmanship. Refer to terms and conditions of sale for specifics.

Maintenance

The AD-1250 Airflow Measuring Stations have no components that require routine scheduled maintenance.

During normal maintenance, damper blades should be wiped clean if necessary and opened/closed to verify complete rotation and sealing.

Technical Specifications

AD-1250 Airflow Measuring Station¹

Leakage Resistance - Fully Closed	4 CFM/sq ft maximum at 2.5 in. static pressure				
Operating Torque	1 in. static pressure and 1,000 FPM (305 MPM) fully open approach velocity 7 lb-in/sq ft				
Pressure Drop (inches WG) - Fully Open		1,000 FPM (305 MPM)	2,000 FPM (610 MPM)	3,000 FPM (914 MPM)	4,000 FPM (1219 MPM)
	24 x 24 in. (609 x 609 mm) 36 x 36 in. (914 x 914 mm)	0.039 0.04	0.11 0.11	0.26 0.22	0.49 0.37
Velocity Requirements	Minimum 300 FPM (91 MPM) Maximum 5,000 FPM (1,524 MPM)				
Temperature Rating	Standard Operating Conditions: -22 to 140°F (-30 to 60°C) Actuator: -4 to 122°F (-20 to 50°C)				
Approximate Weight	Damper: 8 lb/sq ft (3.69 kg/sq ft) Actuator: 2.9 lb (1.32 kg) per actuator Sensor: 1 lb (0.45 kg)				

1. Measuring stations are tested at an AMCA Certified Laboratory using instrumentation and procedures in accordance with AMCA Standard No. 610-93, airflow Station Performance.

The performance specifications are nominal and conform to acceptable industry standards. For application at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products.

Refer to the M9220-xxx-3 Electric Spring Return Actuators Product Bulletin (LIT-12011057) for necessary information on operating and performance specifications for the actuator.



Building Efficiency

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